REMARKS

This is in response to the Office Action dated September 22, 2006, designated as FINAL, and currently outstanding with respect to the above-identified application. Claims 1 – 12 were pending at the time of the issuance of the currently outstanding final Office action. The action rejects claims 1 – 12. Claim 1 is hereby amended to incorporate the subject matter of claim 2. Claim 2 is hereby canceled, without prejudice. Accordingly, claims 1 and 3 – 12 are pending after entry of this Amendment. Applicants make these amendments without prejudice to pursuing the original subject matter of this application in a later filed application claiming benefit of the instant application, including without prejudice to any determination of equivalents of the claimed subject matter. No new matter has been added, and no new issues are raised by the amendment.

In the final Office action, the Examiner has:

1. Rejected claims 1 – 11 under 35 U.S.C. 103(a) over JP Patent Publication No. 2002-151494A to Yara et al. in view of US Pat. No. 5,549,780 to Koinuma et al. and Japanese Patent No. 09092493 to Kubota et al.
2. Rejected claim 12 under 35 U.S.C. 103(a) over Yara et al. and Koinuma et al. and Kubota et al. as applied to claims 1 – 11, and further in view of Japanese Patent No. 2001103199 a to Nakamura et al.

Regarding claim 1, as amended herein the gas supplying means is inside the first electrode, and the gas exhausting means is inside the second electrode. Therefore, neither plasma nor any abnormal electrical discharge can be generated in either the gas supply or exhaust passageways. Please refer to the enclosed illustration derived from Figure 1 of the instant application, in which electrodes 1 and 3 are highlighted in red, and central electrode 2 is highlighted in yellow. This more clearly demonstrates that the processing gas flows into the

plasma generating region 6 entirely within either electrode 1 or 3, and flows out of the plasma generating region 6 entirely within electrode 2. Unlike the situation in all of the cited references, the gas does not flow in any region interposed between electrodes of opposite polarity. Note that in Yara et al., the processing gas flows vertically in a region interposed between electrode 2 and electrode 3 (Figures 2 and 3 of Japanese Publication No. 2002-151494). In Koinuma et al., the processing gas flows vertically in a region interposed between electrode 11 and electrode 12 (Figures 1 and 6 of U.S. Pat. No. 5,549,780). Thus plasma is generated in that region. In Nakamura et al., the processing gas supplied at (a) and exhausted at (b) flows in a region interposed between electrodes 2 and electrodes 3 (Figure 1 and others in Japanese Publication No. 2001-102199). In Kubota et al., the processing gas flows vertically in a region interposed between electrode 2 and electrode 3 (Figure 9 of Japanese Publication No. 09-092493), and between electrode 24 and 25 (Figure 2 of Japanese Publication No. 09-092493). Moreover, in Kubota et al., as shown in Figure 2, the gas exhausting means 43, although within a dielectric 29, does *not* pass through the electrode 24.

Therefore, none of the cited references individually or in combination teach or suggest the placement of gas supplying means within one electrode and the gas exhausting means within another electrode. The structural differences between the claimed invention and the devices disclosed in the cited references uniquely result in the formation of plasma in region 6 (as shown in Figure 1 of the instant application) immediately adjacent to the object being processed, while the gas is moving in a direction substantially parallel to the surface of the object being treated. Thus, unlike the devices disclosed in the references, for example, ions do not accelerate "toward the surface 9a to be processed." (Specification p. 14, ll. 27-28) Consequently "charge up damage" on the surface of the substrate can be minimized. (Id. at ll. 29-30, *see also* Specification p. 5, ll. 22-29) Formation of plasma in the passageways that either supply 15c or exhaust 16c the processing gas is inhibited because each passageway is surrounded by a single electrode. (see, e.g., Specification p. 13, ll. 9-12: "...the processing gas passes through the inside of electrodes 1 to 3. In electrodes 1 and 3, there is no potential difference. Therefore, in principle, plasma or abnormal discharge never occurs in gas supply line 15.")

Given the distinguishing features noted above, the plasma processing apparatus disclosed by Yara et al. is *not* substantially as claimed herein. Nor does combining the coated electrodes of Koinuma et al. with Yara et al. teach or suggest the radically different structure of the instant invention as recited in claim 1 as amended. The additional disclosure of Kubota et al. of a gas exhausting means in the surface of a dielectric fails to teach or suggest to one of ordinary skill the unique benefits of placing the gas supplying means within one electrode and the gas exhausting means within another electrode. Accordingly, claim 1 and all the claims depending therefrom, would not have been obvious to one of ordinary skill in the art for at least the above reasons, and are in immediate condition for allowance.

Regarding claim 3, the provision of dielectric material around the gas supplying and gas exhausting means is a further limitation of the structure recited in claim 1 and is thus allowable on that basis. One advantage, for example, of providing dielectric over the coated surfaces opposing the surface of the object is that plasma can be generated over a wider area within the plasma generating region 6. (see, e.g., Specification, p. 4, ll. 25-28: "...as the dielectric is provided to cover the coated surfaces opposing to the surface of the object, discharge is not concentrated at a portion where the first and second electrodes are closest to each other.") There is nothing in the references cited to suggest to one skilled in the art to place dielectric around gas supplying and exhausting means located within the electrodes as recited in claim 1 as amended. Regarding claim 5, it is allowable for at least the same reasons as claim 1.

Regarding claims 7 and 10, nothing in the prior art suggests that modifying the electrode configurations with respect to the structure of claim 1 would be the product of routine experimentation. The enhanced efficiency with which the plasma is generated according to the electrode configurations recited in claims 7 and 10 is discussed throughout the Specification, and is not suggested by the prior art. (see, e.g., Specification, p. 20, ll. 2-13: "...it becomes possible to more positively drive the processing gas supplied to the surface 9a to be processed to plasma generating region 6. Thus, larger amount[s] of processing gas can be turned to plasma at plasma

generating region 6, and the efficiency of plasma processing can be improved.") (see also, e.g., Specification p. 16, ll. 5-19: "In order to supply larger amount[s] of processing gas to plasma generating region 6, it is necessary to make the distance L1 larger as compared with the distance L2. ... In order to recover the processing gas from gas exhaust opening 5 with high efficiency, it is necessary to make the distance L3 larger as compared with the distance L2.") The structures recited in claims 7 and 10 provide enhanced functionality of the structure of claim 1, and are thus both allowable subject matter on that basis.

Regarding claim 9, a limitation is placed on claim 1 specifying that the flow rate of gas being exhausted is no less than the total flow rate of gas being supplied. This arrangement allows the device to be used, for example, without introducing inert gas into the system to help exhaust the plasma. (see, e.g., Specification p. 6, ll. 23-30: "Thus, leakage of the processing gas from the space between the object surface and the dielectric can be prevented. Further, it is unnecessary to blow an inert gas or the like toward the surface of the object in order to protect the object from contaminating [the] atmosphere.") Note that Yara et al. discloses the need for inert gas to function as a "gas curtain" in the operation of the plasma processing apparatus. (see Fig. 3 and paragraphs 63 and 64 of Yara et al. JPO online translation, Publication No. 2002-151494). Thus, claim 9 recites additionally patentable subject matter.

Regarding claim 12, the second electrode, which incorporates the gas exhausting means, is located between the first and third electrodes. With this configuration, the processing gas that flows into region 6 as shown in Figure 1 of the instant application, where the gas is converted to plasma, can be exhausted through the center electrode. Among other benefits, for example, external electric fields generated by the electrodes can be reduced. (see, e.g., Specification p. 18, ll. 24-28: "Thus, electric fields formed outside electrodes 1 and 3 are cancelled by each other, and a plasma processing apparatus with small leakage of electromagnetic wave[s] can be realized.") Nakamura et al. discloses a lengthened plasma processing space by providing additional electrodes on either side of the object being treated (Figure 11 of Japanese Publication No. 2001-102199). Nakamura et al. does not teach or suggest, either individually or in

combination with the other references, the exhausting of processing gas through a center electrode, thus foregoing the benefits of such an arrangement, examples of which are provided above.

Finally, as an incidental matter, the Applicants believe that the Examiner's citation to Nakamura et al. is incorrect. The Applicants believe that the correct citation is to Japanese Patent Publication No. 2001-102199 to Nakamura et al., directed to a "Plasma treatment apparatus and method therefor."

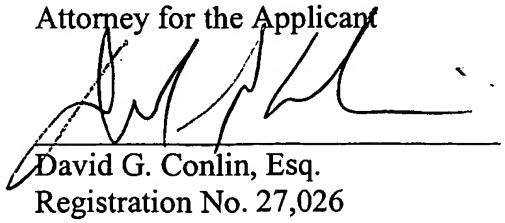
CONCLUSION

In view of the above amendments and Remarks, Applicants believe the pending application is in condition for immediate allowance. Should any of the claims not be found to be in condition for allowance, the Examiner is requested to call Applicants' undersigned representative so that an interview can be arranged concerning the application. The Applicants thank the Examiner in advance for this courtesy.

The Applicants believe that no fee is due to consider the present amendment. Nevertheless, the Director is hereby authorized to charge or credit any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1105.

Respectfully submitted,
EDWARDS ANGELL PALMER & DODGE, LLP

Attorney for the Applicant



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David G. Conlin, Esq.
Registration No. 27,026
P.O. Box 55874
Boston, Massachusetts 02205